

Friends of Jerusalem Botanical Gardens

Working Holiday

3 - 21 March 2011



***Anemone coronaria* in Eucalyptus Scrub, JBG**

Alice Riches, June 2011

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Introduction

My visit to Jerusalem Botanical Gardens (JBG) was organized by the UK Friends Association; the trip was led by Neil Miller, Head Gardener of Hever Castle in Kent.

I spent two wonderful weeks in Israel with eight other participants, working at JBG, touring the country to visit other gardens, to see the native flora and the some of the many historic sights.



Working Holiday Group, JBG

From left to right: Rosanna Porta (Botanical Gardens, Kew); Self; Patricia Craven and Catherine Bacon (The Savill Garden, Windsor); Daniela Sikora (Self-Employed Gardener and Garden Designer); Brenda Weaver, Daniel Fox and Neil Miller (Hever Castle); Angela Hamilton and Andrew Proctor (keen amateur gardeners).

As a group we had great fun working together alongside JBG staff with different plant collections, undertaking varied tasks ranging from basic maintenance to plant propagation and planting.

The UK Friends Association have been arranging for individuals and groups of volunteers to work at JBG for over twenty years and such exchanges have been critical to the garden's success since its creation.

Aims and Objectives

I had several aims in mind when I decided to take part in the trip. Firstly, I was keen to gain experience working in other garden environments for my Continuing Professional Development. By visiting a garden outside the UK, I also expected to benefit from the opportunity to develop and share existing skills with horticulturists from other countries.

Secondly, I hoped to learn about how plants are grown in Botanical gardens to support teaching programmes and in particular as part of the 'Coexistence' project at JBG (aimed at bridging the divide between the country's different ethnic communities).

JBG has a key role in conserving Israel's plant biodiversity, so my third objective for the trip was to learn more about the native flora of Israel and conservation efforts to protect native and endemic plant species in the region.



***Lupinus pilosus* (plants grown from seed collected from a wild population in northern Israel, JBG)**

Climate and Geography

Israel is at a junction, where the Mediterranean and Desert climate zones meet. This means that many plant species reach their furthest southern distribution in Israel and there are those that do not venture any further north than the country. As I discovered, Israel is home to a stunning variety of plants and animals (some 47,000 living species have been identified).

In northern Israel, the Mediterranean climate is seasonal. It is characterised by wet, though not particularly cold winters and hot, dry summers. The annual rainfall is moderate, between 400 - 700mm; the rainy season extends from October to early May and it rained heavily during our first week at JBG.

The southern and eastern areas of the country have a mostly arid climate. Over 60% of Israel is desert, with an annual rainfall of less than 200mm and as little as 30mm around Eilat in the south.

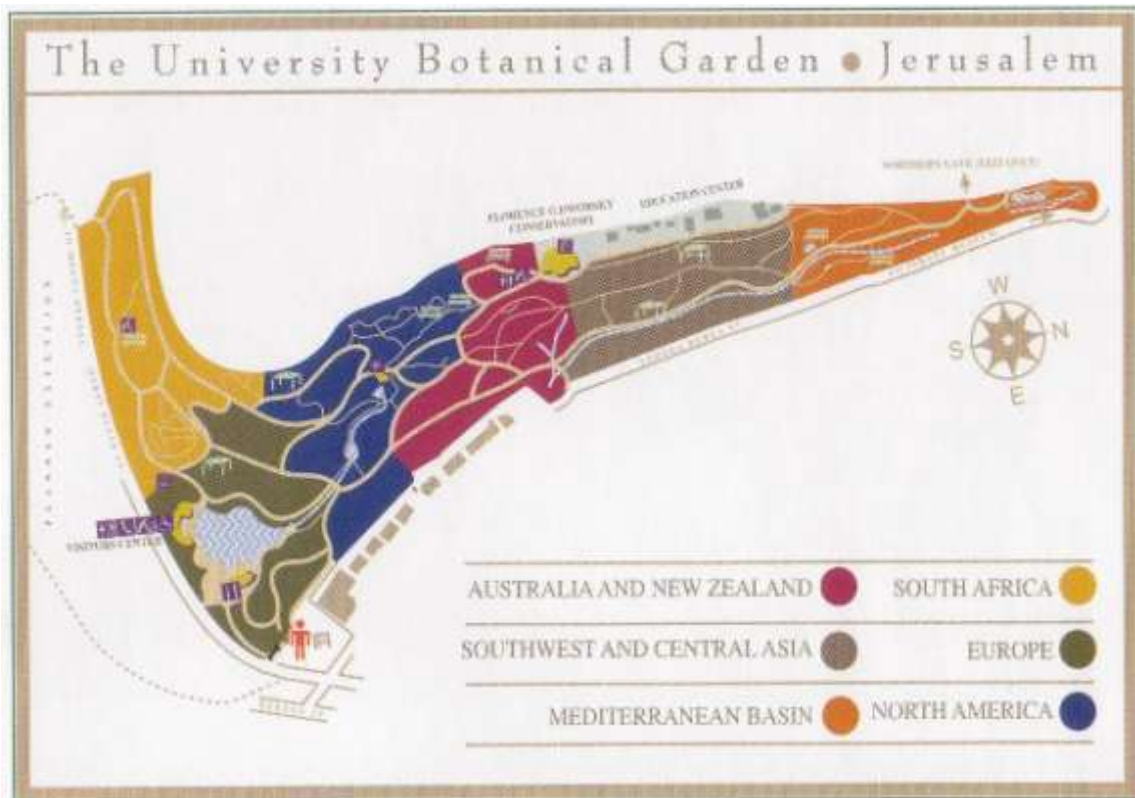
A growing population, urbanisation and increasing industrial development in Israel is destroying the country's natural habitats and propelling biodiversity into a decline. The State has responded by pronouncing a fifth of its land area as nature reserves.



View across the Dead Sea (at some 400m below sea level, the lowest place on Earth) to the hills of Jordan, from En Gedi Nature Reserve

Jerusalem Botanical Gardens

Located next to the Hebrew University's Givat Ram Campus in West Jerusalem, the Botanical Gardens occupies a 30 acre site. The plant collection contains more than 10,000 taxa, six phyto-geographical sections and display gardens focusing on themes ranging from medicinal to drought-resistant plants.



Map of Botanical Gardens

The development of botanical research and teaching in Israel is very closely associated with the development of settlement in the country.

In 1926, land was purchased on Mount Scopus in East Jerusalem for the purpose of establishing a Botanical Garden at the Hebrew University. However, following the division of Jerusalem at the end of the War of Independence in 1948, the connection with the garden at the Mt. Scopus campus was discontinued; nowadays, it is home to the Native Plant collection.

The development of a new University campus in West Jerusalem was started in 1954 and a new garden was created, but the development needs of the University in the 1960s led to the decision to move the garden in 1962 to its present site on the south-eastern corner of the University campus¹.

¹ For a History of the Garden see *The University Botanical Garden Jerusalem General Guide*, 2000



View of JBG with the hills to the west of Jerusalem in the distance

Compared to similar gardens in the UK, JBG is managed on a very small budget by the Botanical Garden Association (a collaboration between the City of Jerusalem, the Jewish National fund, the Jerusalem Foundation, the C.G.Fund and the Society of Friends of the Botanical Garden).

Proximity to the University enables the Botanical Garden to maintain research and teaching relations with academics and students there, although the University is no longer involved in the administration of the garden.

Paying visitors enjoy the plant collections throughout the year and efforts are made to arrange cultural events in the gardens such as exhibitions and talks to encourage visitors. Popular visitor attractions include the tropical Conservatory and the lakeside Kosher restaurant.

Green spaces in the densely populated city of Jerusalem are few and far between, so the garden is an important amenity for the local community. However, endeavours by the Botanical garden to raise public awareness of the work done at JBG to conserve plant biodiversity are constrained by its modest financial resources.



Plants of the Month Display, JBG School-aged girl with own garden, JBG

Education at JBG

The education programme offered to school-aged children at JBG is regarded as a priority and it was wonderful to see so many children and young people in the garden throughout our time there. March weather in Israel is much more conducive to outdoor classrooms than in the UK!

During our visit, I was fortunate to have the opportunity to talk to the energetic new Head of Education, Leah Garzon. She explained that in Israel most young people grow up in urbanised environments, so opportunities to encounter nature are of great importance.

Leah plans activities for children of all ages and co-ordinates her workshops with the school curriculum. Activities also support the aims of JBG, for example in its work to preserve ethno-botanically important plants; a workshop focuses on how to make a cosmetic gel out of *Aloe vera*.

The Education Department is assisted by *sherut-leumi* (young people doing National Service, which is compulsory for all school leavers in Israel). Great importance has also been placed on developing the gardens as a centre for therapeutic activities for special needs groups, such as disabled Israel Defence Force veterans and trauma victims.



Young Muslim Women making gel out *Aloe vera*, JBG

Of particular interest is the Co-existence project involving students from Jewish and Arab schools, now in its fifth year. Leah explained that this year children from Abu-Tor and Kiryat Yovel junior schools will get together each week for three months and participate in botanically orientated activities.

The initiative shows that horticulture is a discipline which has the potential to bring people of different backgrounds together and points to the garden as an ideal setting for reconciliation; in a country like Israel, the project offers hope for a more peaceful future.



Outdoor learning opportunities, JBG

Work in the Garden at JBG

i. South West Australia

Our work in the garden was supervised by Head Gardener Eli Becker (below). It was fantastic working with Eli and his team, who mostly spoke excellent English. Together, we cleared and planted up a large area in the South West Australian sub-section; the project was a good opportunity to compare ways of working with the team at JBG and with members of our group from gardens back in the UK.



**Nursery Supervisor
Maya**



**Head Gardener
Eli Becker**



**Gardener
Rotem**

We began by weeding and removing plant material. The plants were then positioned according to their growing requirements. The ground was steep and uneven, with poor access, so it was quite hard work supplying the garden compost to improve the soil around the new plants, which we did using buckets.



South West Australian sub-section, before and after!

Irrigation pipes were installed so that the plants would benefit from watering during the hot, dry summer months (until established). The Israeli gardeners said that they spent many hours during the summer maintaining the pipes, but explained that intensive irrigation is essential because of Israel's climate. Indeed, irrigation pipes are used very widely in the country, both in gardens and in municipal areas, in spite of concerns about a lack of water and water security (an issue which is very high on the political agenda in Israel as in other parts of the Middle East).



Irrigation pipes are used widely at JBG Felt collars

We made planting holes using mattocks, which penetrated the hard ground better than hand trowels or border spades. Once planted, we put a felt collar around the plants to protect their stems from the bark mulch.



Working Holiday Teamwork, JBG

In a lecture given by Eli on the flora of South West Australia, we learnt that one of the plant families present mainly in the Southern hemisphere and typical of South West Australia is Protaceae. Plants of this family have hard fruits and their seeds are dispersed only after fire; representatives in the sub-section at JBG include the genera *Banksia*, *Grevillea* and *Hakea*.

The family Myrtaceae is also conspicuous in wide areas of the region, for example *Eucalyptus* has about 700 species mainly in Australia. The genus is well represented at JBG and I saw *Eucalyptus torquata* and *Eucalyptus grossa* in flower amongst others. The sub-section also displays species of the Western Tea Myrtle, such as *Melaleuca nesophylla* with its impressive violet and reddish flowers.

ii. South Africa



Savannah Flora and Bush Deserts, JBG

We also worked in a sub-section of South Africa which focuses on Savannah Flora and Bush deserts. I learnt that this type of flora occurs in the northern part of South Africa, on the country's vast central plateau; a dry, continental region characterised by seasonality and summer rains, where fire constitutes an important ecological factor.

Most of the vegetation consists of grasses and sparsely distributed trees that shed their leaves during the dry season. Trees such as species of *Zizyphus* and *Acacia albida* are ubiquitous. Succulents, including many species of *Aloe*, are represented in the South African section at JBG and attract the nectar seeking Palestinian sunbird.



***Nectarinia osia* (stock photo)**



***Aloe marlothii*, JBG**

iii. The Plant Nursery

Heavy rain during our first week meant that we spent several days here taking cuttings and sowing seeds.



Glasshouse at JBG

We were given a tour of the facilities by the Nursery Supervisor, Maya; highlights included seeing seedlings of the endangered native *Campanula peregrina*, germinating at JBG for the first time, and the collection of geophytes (plants with subterranean buds).



***Campanula peregrina* seedlings, JBG**



Taking Softwood Cuttings, JBG

The geophyte collection consists of more than 100 species, originating from different geographical regions of the world and a range of climatic conditions. A collection of *Iris* species of the group *Oncocyclus*, many of which are endemic to Israel or neighbouring countries, was particularly impressive.

The collection serves for comparative research and for the breeding of new varieties and cross breeds, with a view to advancing commercial floriculture in Israel and for planting at JBG. It was interesting to see 'rescue transfers' of endangered plant populations (mainly transplanted from construction sites) such as the Autumn crocus *Sternbergia clusiana* and the rare *Iris vartani*, which is endemic to the Jerusalem area.

Excursions

i. Mount Scopus Campus; The Native Plant Collection

We were very fortunate to be given a tour of the collection by Dr Michael Avishai, Emeritus Scientific Director at JBG. Michael's knowledge of Israel's botany is extensive and he gave us a real insight into the amazing diversity of the country's flora.



Dr Michael Avishai in front of entrance to the Nicanor Tomb (1st century CE) below

It was fascinating to learn that from 1948-1967, the garden on Mount Scopus was abandoned in what was part of the Israeli enclave in Jordanian territory. With the construction of the Hebrew university's campus on Mount Scopus in the 1970's the restoration of the garden began.

Also of interest at the site is a monumental ancient burial complex, hewn into the soft Jerusalem limestone.





View across East Jerusalem from the campus of the Hebrew University on Mount Scopus; the site is home to the Native Plant Collection

The principal plant communities are represented in the garden as they appear in their natural geographical regions.



It was interesting to observe how the indigenous vegetation withstands the poor soil and micro-climatic conditions, combined with a lack of water, at the site. The picture on the left shows clearly how plant roots have explored and penetrated cracks in the rock to find water.

Plant roots explore limestone cliff

ii. En Gedi Botanical Garden and Nature Reserve



On a day trip organised for our group by the JBG Friends Association, we went through the Judean Desert to the Dead Sea. We were given a fascinating tour of the Botanical Garden at Kibbutz En Gedi, a scenic two hour drive from Jerusalem; Michael Avishai was our guide.

View from En Gedi Botanical Garden of surrounding landscape

Kibbutz En Gedi is located on the eastern edge of the Judean wilderness, on the western shore of the Dead Sea. Around 900 African and tropical species are grown in this parched, saline landscape, where summer temperatures reach up to 50°C. The garden also displays desert flora from throughout the world, plants from the local En Gedi Oasis such as *Calotropis procera* (The Sodom Apple) and *Tamarix palestina*, approximately 40 species of ornamental Palm trees, Cacti and Succulents.



Calotropis procera

It was extraordinary to behold the lush vegetation in the garden and compare it to the surrounding landscape, inhabited by wild Ibex and Rock Hyrax. Michael drew our attention to examples in the garden of the many and varied adaptations which allow plant life to flourish in extreme conditions. For example, *Tamarix aphylla*, which grows wild in the Negev Desert, has leaves which secrete salt to overcome dryness and saltiness.

Before returning to Jerusalem, we also enjoyed exploring part of the nearby En Gedi Nature Reserve, which covers an area of 3,587 acres. Two deep valleys

run through the reserve; Wadi David and Wadi Arugot. Underground springs supplied by rainfall in the Judea, form streams that flow down the gullies in between the two Wadis. A significant amount of the reserve's spring water is captured and used by Kibbutz En Gedi².

The oasis sustains the densest concentration of semi-tropical plants growing in the wild in Israel, although the plant biodiversity has been diminished since the surrounding settlements began to use the reserve's water for agricultural purposes. Prominent in the landscape is *Ziziphus spina-christi* (Christ-thorn Jujube, so named because according to Christian tradition the crown of thorns placed on the head of Jesus was made of Jujube branches.)

Calotropis procera (previous page), whose trunk is covered with thick, cracked bark, is also very common at En Gedi; it is distinguished by its large leaves and fruit that resemble apples. It is mentioned in Ancient texts including the Mishnah and the Talmud.

We also saw wetland vegetation including *Arundo donax* (The Cyprus Cane), lichens and ferns, such as *Adiantum capillus* covering the rocks by David's Waterfall at the head of Wadi David (below).



Wadi David (Left) leading to David's Fall (Right).

² Aptly named, En Gedi means 'spring' or 'fountain of the kid'. It was first known as Hazezon Tamar, which means 'pruning of palms' suggesting that date palms once grew here (Genesis 14:7;Chronicles 20:2)

iii. Mount Carmel, Haifa and the Bahá'í Gardens

In contrast to the geographical lows of the Dead Sea region, were the heights of Mount Carmel in northern Israel. On another day trip, we passed through a cluster of Druze villages en route to Haifa, Israel's third largest city; built above its harbour on the slopes of the 'Holy Mountain' Carmel next to the Mediterranean Sea.



We paused *en route* to observe the devastating effect of forest fires which spread through the region in December 2010. We also admired drifts of *Asphodelus aestivalus* and the common *Cyclamen persicum* which grows in the shade of the Mediterranean forests and predominately limestone outcrops of the region. Only the black-centered, post-box red native *Anemone coronaria* became a more familiar sight than the nodding *Cyclamen* during our visit.

Forest fires devastated an estimated 12, 500 acres of woodland and killed more than 40 people in December 2010



Asphodelus aestivalus



***Cyclamen persicum*
(Israel's National Flower)**

Haifa's urban landscape is dominated by the golden dome of the Baha'i Temple, set in formal gardens which frame panoramic views of the city.



View of Haifa from the terraced Bahá'í Gardens

We were given a guided tour of the Bahá'í Gardens, which are arranged in nineteen terraces extending all the way up the northern slope of Mount Carmel.

The Shrine of the Báb (the resting place of the Prophet of the Bahá'í Faith) stands on the central terrace, looking across the bay towards the crusader town of Akko. Formal flower beds in geometrical shapes, intersected by gravel paths and clipped hedges, are the dominant elements in this restrained, manicured garden which aims to reflect the tranquillity and uplifting spirit of Haifa (the administrative and spiritual heart of the Bahá'í community)³.



Formal Bedding schemes made us Brits feel at home!

³ In July 2008, the Bahá'í gardens in Haifa and Akko were included on UNESCO's World Heritage List, in recognition of their "outstanding universal value" as holy places and places of pilgrimage.

iv. Nazareth, Mount Tabor and the Galilee

The working holiday group dispersed after 14 days; I stayed in Israel for several more days to spend time sight-seeing in Jerusalem and to explore the surrounding area. On a day trip from Jerusalem with Ofri Bar, Plant Records Officer at JBG and Guy Moore (Worms Scholar and Kew Diploma student) I went to Nazareth and the Galilee, which meant a scenic drive through the fertile Jezreel Valley between Samaria and the Galilee.

We stopped at a nature reserve in the shadow of Mount Tabor near Nazareth, close to agricultural land where olives, almonds, pistachios and chickpeas are grown, as well as a high percentage of Israel's fruit and vegetables.

We were very fortunate to see the beautiful *Iris bismarckiana* flowering here. A rare species, following a recent decline, *I. bismarckiana* is now limited to a few populations in Israel with only a single population protected in a nature reserve⁴.



Endangered native *Iris bismarckiana*

⁴ *Israel Journal of Ecology and Evolution*, Vol. 52, 2006, pp111-122

Urban development of natural and traditionally farmed land in Israel has isolated remaining populations of *I. bismarckiana* and a study supported by the Israel Nature and Parks Authority has found that natural cross-pollination between them has probably ceased.

The study proposes that supplementary cross-pollination, as well as transplanting of seed, seedlings and plants between nearby populations (in an attempt to widen the genetic variability in each population) would increase seed production and improve the long-term survival chances of *I. bismarckiana*.

Later that day, at another nature reserve on the Western shore of Lake Galilee, we saw the equally enthralling, pungent smelling *Arum palaestinum*.



Lake Galilee, at 211 metres below sea level, is the lowest freshwater lake in the world. At its widest point, the lake is 13 kilometres from east to west and 22 kilometres from north to south; it forms part of the geological fault which runs from Syria to Africa.

It was with obvious pride that Ofri showed us Lake Galilee, which he explained is the “jewel in the crown” of Israel’s natural resources.

***Arum palaestinum* (Lake Galilee behind)**

v. Tulip mania



***Tulipa agenensis* (details below)**

Another botanical high-light of my trip, was seeing the native *Tulipa agenensis* growing in large numbers in Mediterranean woodland, in the mountains to the west of Jerusalem. Tulips are such popular ornamental plants in the UK; I gained a really useful insight into their cultivation requirements by seeing these wild populations, growing on the grassy banks and in rocky places, in the dappled shade of the pine forest.

Tulipa agenensis has delicate, scarlet coloured flowers. Its petals have black basal blotches with yellow margins and its lanceolate leaves have very distinctive wavy margins. The whole plant grows up to 40 cm tall.



Conclusion

I spent nearly three weeks in Israel and during that time I worked at Jerusalem's Botanical Garden, where I gained valuable horticultural experience and thoroughly enjoyed meeting other gardeners (getting to know members of our own group and the Israeli horticulturists). We enjoyed a very warm welcome from everyone at JBG and generous hospitality from the Friends Association, including wonderful *Shabbat* suppers with host families on arrival.

Barbara Steinberg of the UK Friends of JBG organised the Working Holiday and joined our group for part of the trip; she worked extremely hard to ensure that we all had a good experience in Israel (for most of us, including me, it was my first time in the country). Thank you, Barbara.

Our group benefited from the unique opportunity to see plants in their natural habitats, including the Judean wilderness, the Dead Sea Basin, the Desert oasis at En Gedi and Mediterranean woodland and scrub ('the green and the burned mountains' of Carmel).

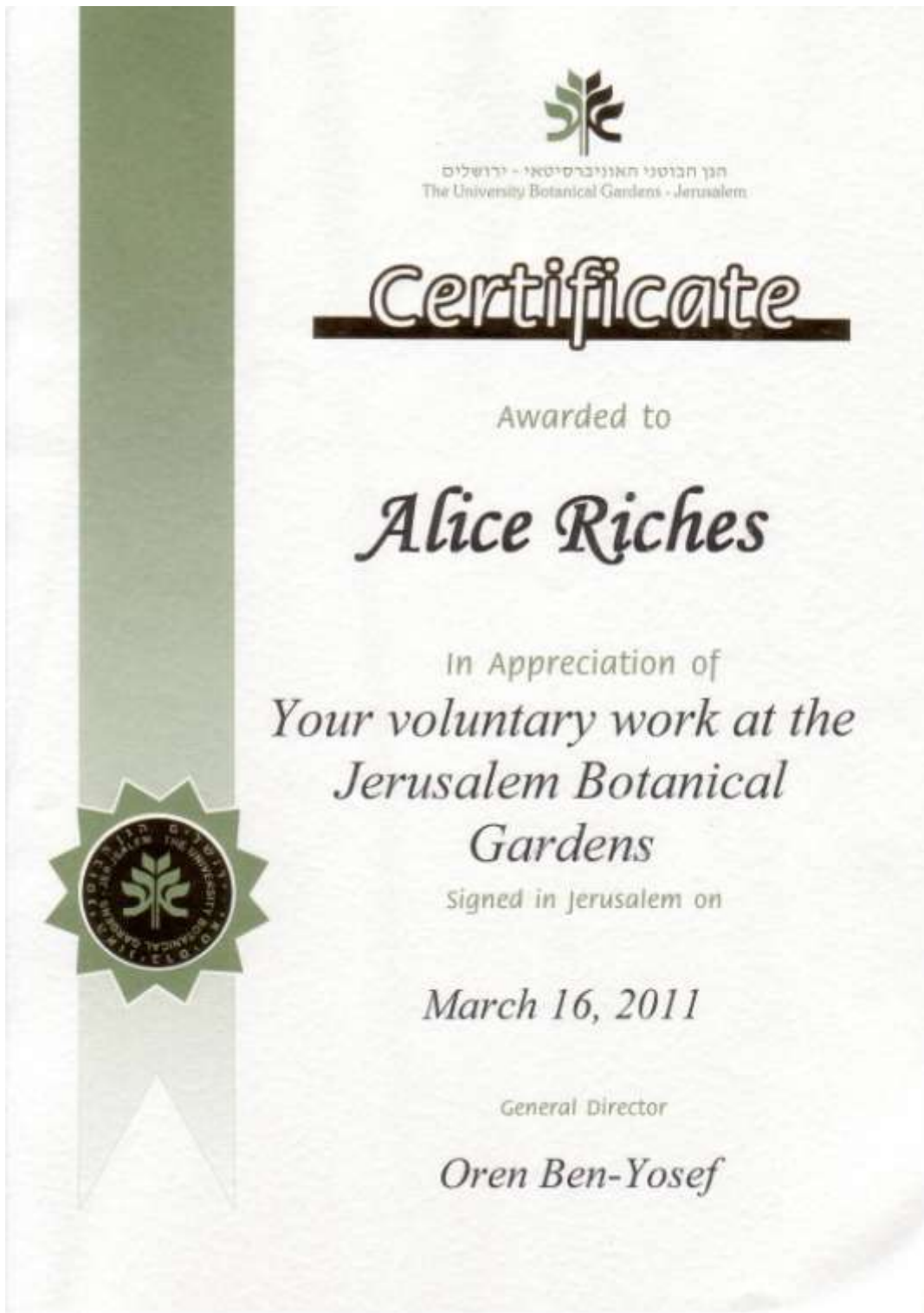
I also visited nature reserves in the Jezreel valley and the Galilee and Mediterranean woodland in the mountains near Jerusalem. I would like to thank Ofri Bar and Maya Aboubu for organising these excursions.

I learnt a great deal about the flora of Israel during my time in the country, as well as the conservation efforts to protect native and endemic plant species in the region. Michael Avishai's introductory tours of the Native Plant Collection and of En Gedi Botanical Gardens were particularly inspiring.

I would also like to thank colleagues at RHS Rosemoor for their advice in planning my trip and help with applications for funding. I was very fortunate to gain the support of the Merlin Trust and the Historic and Botanic Gardens Bursary Scheme, which enabled me to make the most of the unique opportunity to visit Israel and work at JBG.

Appendices

1. Certificate of awarded to Working Holiday Participants by JBG



2. Breakdown of Costs

Flights and B&B accommodation (arranged by the Friends of JBG, payable in advance)	£820
Food (18 days approx @ £15 p/d)	£285
Bus Fares	£10
Contribution towards Car Hire & Petrol	£25
Entrance Fees	£20
Total	£1160

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